

Q: Good afternoon. My name is Anna Newman. Today is April 6, 2017. I am here at the City Hall with Harvey Parad. Together we are participating in Newton Talks Oral History Project that is being conducted with the Newton Free Library, Historic Newton, and the Newton Senior Center. So Harvey, what is your connection to Newton?

A: I moved to Newton because my family was in Boston. My father was a plumbing contractor, had a business in Boston, and by the time I was in third grade I had a critical education crisis. I wasn't able to write script, I couldn't read very well and the school had written me off as just incapable of learning anything. So my folks asked the school to figure it out and they sent me to Children's Hospital and other places. And what they figured out is the problem really wasn't with me, it was really with school.

And so my parents made a difficult decision, they left business, family friends, not that it's a hundred miles or a thousand mile, but they dropped everything, and all of a sudden I was living in another house in Newton. And we were in the Claflin School District, and in grades four, five and six I had Mrs. Carlson and Miss Rowley, and back then there were no teachers aides, there was no special education. They literally had to wait until the class was doing something that she could take me in the corner of the room and spend time with me. And if it wasn't for those two teachers over that three year period, I would have been in real trouble by the time I was in junior high school.

Q: Wow. So what else was life like for you before you started working?

A: Well, I was, you know, a nerd in engine science, and took things apart. My father was a plumbing contractor, he'd take me with him on Saturdays and I'd watched the men and by the time I was seven or eight, they were lowering me in walls to do soldering and all that stuff. So by the time I was--moved to Newton, I was nine or ten, I had a little electronics lab, I was fixing

radios and TVs, I was--I had a photography lab. I love photography, okay? But there's a limit to how many things you can, how many things you can do.

And what my father did, which is really...should be inspirational, is he was more than just a plumbing contractor. He would be on a very personal basis with his customer. He recruited for me. He would always ask, "Oh and what do you do? What does your husband do?" and he found out this guy's a professor here, this guy works at Lincoln Labs, this guy, okay. My father found me mentors. And some of these mentors spent almost no time to me, they would simply get updates from my father and they'd call me and say "We're having this thing here, come to this, do this," whatever.

And while I can't talk about all the mentors, one of the most important ones was Dr. Jordan Baruch. He lived at the time near where the second version of Newton North High School was, and he was a professor of electrical engineering at MIT and director of the computational lab, which was at the time, two computers fit on this floor. And he told me, "Come with me on Saturday." He would--brought me into the room with the key punch machines and he would say, "You show him how to use the key punch machine, here the exercises are over here, these are MIT students." There were 25 exercises to learn how to do Fortran. And they were pretty good exercises, they explained it what was going to do, explained the operators, and then wanted you to do the exercise and you'd punch cards. Then you knocked on the window to the computer operator. Back then you really needed specialized training to operate a computer. And he said "Whatever the kid gives you," he said, "just process it and make sure when it's ready that he knows, you know, to give it back to him." And so I think I only spent three or four Saturdays and that was it, I knew Fortran.

Q: And how old were you at this time?

A: Probably between nine and ten. And when I was ten, he called up out of the clear blue. Now you've got to remember another thing, okay, there's no email, you know, I'm not old enough to drive. He called up my mother and said, "Harvey would enjoy Grace Hopper is going to give a lecture on Wednesday at eight o'clock." So my mother drove me in and I heard what's called the nanosecond lecture from Grace Hopper. Grace Hopper is considered the mother of computing.

Later in my career, when I was 28 years old I was working for a computer company doing something of great interest to her, and she came to talk to me. And she was a close talker, nose-to-nose, like Seinfeld does the nose-to-nose. And it's one of the few times in my life that I had to take my clothes off because I was dripping wet. We had such an intense conversation, and the mind was like I was when I was 10 years old. She never grew up, her mind, she was a visionary. And so just because of that one connection and that's one of many, I learned things and I met people.

And I also learned about--back then you couldn't get on the internet and find all the nerds. You know, now you can watch TV, you can watch Big Bang. My children make fun of me all the time, and those are nerds living together. But how do you find the other nerds, there's no ad in the newspaper. It turns out that there used to be a couple of surplus places in the Boston area and if you went on an afternoon or on Saturday morning, again I couldn't drive, so someone had to take me. I'd stayed for two or three hours, I'd meet other people. And so that was like my second family, where all those people and this guy works at this company, and one was a computer engineer. He brought me into Honeywell, showing me how they were refurbishing the machines. They used to rent them as they'd come in and go out. And so that was my second family.

So by the time I got into high school, I knew a lot of stuff. Newton High School had an amazing physics and chemistry teacher. You don't call them professors. But when I went to college and I had professors, who were actually graduate students, that were teaching physics and chemistry, I

almost broke out in tears I was so upset. Like they weren't telling me all the neat stuff. The instructors that were at Newton North High School that did that were really inspirational. In terms of the periodic chart, you not only had to memorize it but you have to understand the interaction between all those elements. And so by the time my second year in high school, I had already done science fair projects, I had gotten bored with the earlier electronics things and gone from vacuum tubes to transistors and then to integrated circuits.

Q: That brings you to my next question of how did you get from that step to working for the government?

A: Well, the the process of science fairs was you didn't have a real science fair until you got into high school. There was a junior high science fair, and I think we may have gone to Brandeis, I'm not sure, as a regional thing so the high schools could collaborate. But the grades used to be different, high school used to be grades 10, 11, and 12. And I did one project, which it turns out, if you have a cell phone, the SIM chip that you stick in the back that's read-only memory, there was no concept of that. I did a matrix of diodes to send Morse code and to light up a pattern of dots under display. There were no displays back then, okay, and so that was my first project and it made it all the way to MIT. And I didn't get first, second, or third prize, but...and people really didn't know why would you do that, if you didn't have that, you wouldn't have a cell phone. My second project was using integrated circuits and I didn't discover till ten years later and I wouldn't have discovered, if I didn't have a cousin. It's all about connections. I had a cousin who lived in Framingham, worked for Sylvania in a Lincoln Lab. And he told me, he said, "Those integrated circuits were made for the Polaris program." And the ones that I got through my surplus company, for a couple of bucks, had had the part number and the logo for Sylvania ground off it. They had to declassify it before. They had integrated circuits long before Silicon Valley did their thing. But they tried to commercialize it and people couldn't afford to pay 200 dollars.

Q: So this was before are you working in the government?

A: Yes this was before, but it led up to that critical project where I was at the MIT science fair. I think the judging got done on the first day and they were like two more days that were public, one of which must have been on a Monday. And an engineer working in a local company in Cambridge was out for a walk, it was a beautiful sunny day, went to Kreski Auditorium, which is not a geodesic dome but a pretty good working dome thing supported at three points, and walked in, walked up and down, and stopped to talk to me. His name was Bob Moss, he was--he had like a permanent smile imprinted on his face, he was a very happy guy. And he asked me questions about the project and then I...and then he said "You know, I'm an electrical engineer, I'm working up the street. And I've got to work with digital logic, and I haven't done it before. And I read some books and I'm trying to figure out..." And he started writing down a picture, it's just like the movie Good Will Hunting, with the thing on the blackboard. And I shook my head and I said "No, Bob, that's not going to work that way," and I started writing. I said "You gotta do it this way and that way." And we went back and forth for 10, 15, 20 minutes and he said...and the Science Fair is in April, it's like the end of the junior year. He said, "What are you doing this summer?" And so I said "I don't have any plans yet."

It turns out Jordan Baruch had me fill out a form to work at the Cambridge Linear Accelerator, that's where Harvard did stuff for the Manhattan Project. They rejected me because you've got to be 18 to work there. And so before I got that letter of rejection, literally a week, a week and a half tops, between the end of the Science Fair and going for my interview at Electronics Corporation of America and then getting the reject letter, they hired me. And there's a picture of my ID card and you can see because I signed my name in script, I still couldn't write in script, a lot of letters were different angles, okay. I have coordination issues and printing is much, much better for me.

So I went in on an afternoon and I spoke to his boss, which was the principal scientist. It turns out this is One Memorial Drive, you're too young, but if your parents went to the fireworks on the Esplanade and walked across the Longfellow Bridge, which is under construction now, there was this building at the other end with a huge neon sign. We don't allow neon signs anymore. Electronics Corporation of America. And all of the electronics companies used to have circles with lightning bolts in their letters like RCA. But they had a dog, but instead we had a lightning bolt, and it was an animated lightning bolt. So it was really like the Citgo sign, if you know what I'm saying. So they've since long since torn down the building. But the second floor of that building didn't have any windows, it was all painted over and that's where they did their thing.

There was a principal scientist whose name is Dr. James Humphrey. It turns out he was a Newton resident. And I don't know whether he took pity on me because he was a Newton resident and he literally lived, you know, a mile and a half from, you know, from Newton High School. But he had been working on this very difficult problem in physics for a number of years, and had made a breakthrough and published a paper in a journal in 1965. Applied Optics. And he says right at the beginning, he explains it: this is trying to--a practical application of Einstein's 1905 paper which he got a Nobel Prize for, the photoelectric effect, which in concept is very simple, you know, you knock an electron off and you can measure the electric current, but it's really very complicated. And what he was trying to do, his objective was, and now we get into what the project is about, these are things to remind me, if you were to go pretend the earth is flat and you're in Boston versus Washington 400 miles away, and you go to the Prudential Tower and the Washington Monument, and you light a match, can you see the match light? And we were trying to do that from outer space. So Dr. Humphrey introduced himself, he gave me this paper, which is all very high level physics, he says "I'd like you to read this paper and if you have any questions, come in on Saturday, I'll be in the office on Saturday." Okay. And they took me to the personnel department, they introduced me to Rita Murphy. She sits down and says,

“Okay, you're applying for a summer job, here's the form to fill out.” And I filled out the form, and then she says, “You're 16 years old!”

That building was not just office space. The office space was on the fifth floor, the fourth floor was a 200-foot long two-sided production line, and the next floor was a bunch of engineers, the first floor had huge...like you were punching sheet metal fenders for car presses. And there was also dangerous stuff in the middle, chemistry labs and flames, and you name it. It was dangerous, so she said “You can't work here.”

At the time I didn't know the electronic accelerator people were going to tell me the same thing, but it turns out one of my nerd friends, who was a Newton North High School student, but he had very bad rheumatoid arthritis, if it wasn't for the fact that my sister's best friend in high school was his older sister, we never would have met. We only lived like, 15 houses apart. And he was, his father was an engineering genius and he had acquired the gene. Soon after high school he got better, we spent a lot of time together, even before that. And his father's manufacturing plant was in Randolph extruding aluminum and doing electroplating, both of which are extremely dangerous things, so I, out of the clear blue, I came out with a speech for Rita Murphy. I said “Look, if I'm--basically, if I'm not dead by now, you know,” I said, “this is a place where people get hurt all the time and I wore my safety glasses and I always watched where the crane was going. And I was just very careful, because my father was a plumber and they did dangerous stuff too.” So she says, “Well, I don't know.” And I went back upstairs and I finished the interview, when they showed me what it was they were trying to do. And when I came in on Saturday to see to see Dr. Humphrey again, he gave me the ID card and said sign it, you're hired. So in a period of like six, seven weeks, I made this, and you'll get a picture--a piece of test equipment, which probed an integrated circuit wafer and took the measurements, and printed them out on a piece of paper. You couldn't buy equipment to do that; they had the proper thing, but they didn't have the control system, there was no such thing. And it was in the annual--it was in the 1967 annual report. And I stuck my nose into every--you know, all the

different parts of the company. And I was concerned about the fact that after I did that, I had another couple weeks. So I proposed to them, I said, "Look, you're making these big industrial control systems with relays, why aren't you using the little integrated circuits?" And then there was...up through the chain of command and they said, "Absolutely not." But I did it, and then they said "Well stay on with the company and you'll do that development."

And your original question was how did I get involved in the project, was I was all excited about doing the first solid state control systems, which were actually done by a team of engineers other than me, but using my design. They interrupted me and said "We don't want you to work on that anymore." And, like, my thought was I was really heartbroken. They took me down the hall to where the locked doors were, which is where I wasn't allowed to go. They walked me in and it was all sorts of--if you've ever seen a clean room in the corner with some windows, it was an integrated circuit clean room. There were all sorts of very specialized microscopes all over the place. They brought me into the corner with the machine room with the computer, and they introduced me to the department head in charge of statistics and testing, and introduced me to one of their statisticians, who had a problem. And we talked back and forth and they basically said "Can you help this..." I had never mentioned to them I did programming, but they somehow knew, because I talked to someone. They said, "We heard you do programming, you think you could do something to help this guy?" He was still using a mechanical calculator to do statistical calculations. Mathworks on Route 9, their first product was virtually identical to what I wrote in 1967.

Q: So can I go on to...So that's interesting. Would you say that that was--can you tell me, if that wasn't the most memorable experience, but was there a very negative or very positive experience that you remember very clearly?

A: Well, what what led up to that, and I didn't make it very public, because I thought I would get in trouble, is the area outside the locked area had a couple of really strange-looking pieces of test

equipment that had name plates on them saying who made them and what they did. And they gave me a desk and a telephone. This was for the summer job, which was unusual to give a desk and a telephone to a kid. I used to bang my knee when I'd go to my desk. There was a filing cabinet with a tablecloth on top of it, and one day I lifted up the tablecloth. It was a safe, and inside the safe was a very large diameter optical filter. And I wasn't there for a couple of weeks, but the guy took out the optical filter, because I understood physics, light, photography, all that, held it up to the light, put it on the machine, was taking some measurements. When I walked in the room, I started having a discussion, what are we really doing here, and that's when the disclosure about we're making infrared sensors to be up in space to watch for the launch of ICBMs.

Q: And what are ICBMs?

A: Intercontinental ballistic missiles. This was...whole separate discussion leading up to it, but the quick is, you can watch a million documentaries about what's called the nuclear rainbow, the cowboy era that happened after the Manhattan Project. And if it doesn't scare you, there's something wrong with you, because what was detonated in Japan is one ten-thousandth of the smallest warhead, of which there's multiples in just one rocket.

Q: Wow, so...

A: And the objective was, and I'll make it as simple as I can, is that...if you watch war games, you know, you track the missiles across. What no one else can still do to this day is detect the launch at the instant of the launch.

Q: Wow, so can I ask you about--switching gears a little bit, how did you first get involved with the defense support program?

A: It was at MIT. They hired me to do digital logic for that piece of test equipment. And then they figured they couldn't let me go back to school, they had to--they thought I could solve a lot of problems. And then during a period of seven years, I solved a lot of problems. There were no people in uniform there, except when the visionary of this project came to visit. He was a Colonel. He came in the door the first time and someone yelled "Officer on deck!" and a whole bunch of furniture moved and I literally, you know, ducked under a desk, okay. I'm not from a military family, I never got closer. But within a year or so the Colonel knew about "the kid." No one referred to me as "the kid," except for when I'd get called into the office and said "We're going to assign you to work on this thing," the Colonel said "Give it to the kid." And so I, you know, I would have contacted the Colonel years ago, but there's no way of--the whole thing wasn't really made public until 2012, July, when that airliner was shot down over Ukraine. One of the former US Senate Armed Services Committee members--I just happened to turn on the TV at four o'clock in the afternoon to have a sandwich, and he was on TV talking about all sorts of stuff. I said, "He can't talk about that stuff!" And it turns out he wasn't supposed to talk about that stuff. But unlike what it was 20, 30, 40, 50 years ago, it's already on live TV with maybe a five-second delay. And so what transpired in the following couple of days was Vladimir Putin said, "What this guy says isn't at all the case," but the fact is is that we knew the instant, we knew what it was, where it was launched from and what type of missile it was, and so on and so forth. And the Russians were, you know, it was their hard work.

Q: Yeah, so could you just tell us, like, what the defense supports program really was and...?

A: Well, prior to DSP was a project called MIDAS. They had been trying--M-I-D-A-S, which was Missile Defense Alarm System, okay, and back then in the early days of not being able to hide secrets very well, they figured out that using acronyms that actually meant something was a bad thing to do for security. So one of the things I have some paperwork on, is after the Cold War there was a whole bunch of researchers, one notable guy at George Washington University, that wrote--and it's not easy to do, I was thinking about doing this, but it's not easy, Freedom of

Information Act, if you ever want to get into the business, it's a whole area of expertise. And he argued with the government for years about all sorts of papers describing all the things that had transpired, you know, over the years. But DSP was originally thought to be--was the Defense Satellite Program. S for Satellite, they said "Oh, we can't use the word 'satellite.'" So they substituted, metaphorically, I have the piece of paper, it's a top secret document, and basically says metaphorically, this is, you know, what DSP is, but Defense Support Program. What it was and the reason the Air Force did--I did an oral history for them, because after the cat was out of the bag, I felt it safe to call a telephone number. And they won't talk to anyone from outside, but they have public relations people who do, and they said--I started a conversation, I sent them a whole box full of artifacts that was going to end up in the trash. And including my [00:27:10], which Dr. Humphrey had given me, which had the little detector on.

Q: Yeah. Can you explain the detector?

A: Lead sulfide is basically the lead equivalent of iron exposed to oxygen; instead of it being iron oxide it's lead sulfide, the sulfur in the atmosphere, the rotten egg, okay. So if you just take a piece of lead and let it turn that dull color [00:27:40], but if you do it under controlled circumstances, because it's a heavy metal you end up with a long-range infrared detector that can detect a match, if you do everything just right, at four hundred miles. And today, the technology for doing that is not available by Amazon, okay. And it's not available to China, the Soviet Union or whatever. They do it a different way and they still don't have the ability to detect a launch. The whole explosion of the nuclear arms race, the leverage that we had over the other guys was that we had the earlier detection. And not only did President Kennedy and Robert Kennedy negotiate some very crafty stuff, but they had some technical leverage, that you want to keep building more of these warheads. They were talking back then about first strike capability and second response, and all that--this sort of put a quash to that whole process.

Q: That kind of brings it to my next question: what kind of international impact did your product have and how do you feel about that impact that it had?

A: The world still isn't safe, and the problem with that is that people of certain governments don't care about what happens to the rest of the world. But even Vladimir Putin knows that you can't--you just--you have all these nuclear weapons, you just cannot use them. Okay? And today with the Twitter feeds, okay, the people who control all this stuff are pretty nervous, I'm sure.

Q: So I guess moving on kind of to the termination of of your project. Do you recall the day that your project ended?

A: I don't know the exact day because it happened--I was--there were only in this whole project at its peak about 122 people, okay,? So we not only designed the detector, but we did all this micro-fabrication. It was--they were basically glued with epoxy on a block of aluminum with thousands--you know your cable TV wire, that's like a quarter inch diameter--2,380 of those in a bundle. But they weren't quarter-inch, they were like three thousandths of an inch diameter, each all micro-fabricated. So a lot of those lower level fabrication jobs, okay, disappeared and then a few people like me were left to package stuff up to send to the follow-on contractor.

What had happened was some politicians said "We found out about the black project and we want a company in California to do it, because they're in our district." So they packaged up all the equipment and for future production went to a California company, who eight years later was unable to make anything. And then I don't know for sure, but it got transferred somewhere else in the government. And then they finally started making them again. They also started making a different type of detector called mercury cadmium telluride, and the ones that are up there now have both types of detectors, because they have different wavelengths and characteristics. And ironically, when you watch Big Bang Theory, a couple of the episodes, the white board has the

diagram for the layers and the molecules of--and that probably is because that's one of the places where they do all those physics.

Q: So I just want to clarify: DSP--the project you were working on was to create satellites to detect missiles?

A: To detect the launch of missiles. One of my most memorable experiences is the chief mathematician was a very strong guy, he was a boxer and he happened to be in the Air Force when he got out of high school. And I was not a member of senior staff, but every once in a while there was an important meeting, and he would run to go to the meeting, he'd grab me literally by the shoulder, and I weighed 95 pounds, and pick me up. And he used to say--and I didn't understand, because I didn't know military speak--"with me", okay. And I'd go into the meeting. And on November 6th, we launched what was really the first of these satellites. And on November 7th was the first time anyone knew that it would work. And I didn't know at the time, but this is what we found out at the meeting: how do you find out if it works? We actually launched an ICBM and a submarine launch missile, which we thought would absolutely never get detected, and it worked. So on Monday morning, nine o'clock in the morning, there was not a celebration, but a discussion of here's what we did and we were successful, and now we've got to make a half a dozen more just like we did.

And how we managed to do it is--all the technical stuff, is the whole scientific principle of experimenting. And just like with home baked goods, there's accidents. You use, I don't know, you use margarine instead of butter, and you find out. But it was mathematicians, chemists, physics. It was--if you go through regular school process, you will go--whatever your area of interest is--you'll go and you'll get your bachelors, your masters, your PhD, and then you'll be looking for a slot where they do postdoctoral work. And then there's places that are like the cream of the crop for postdoc. That was this group of scientists. And I went right from high school to right from working. Many of them were former MIT and BU professors, scientists that

had worked on other earlier government projects. And it was in a time period just as Lincoln Labs was ramping up. Now anything that's MIT faculty-related that has to, for policy reasons, be done off campus is done in Lincoln Labs.

Q: So, a little bit ago you mentioned a black project. Would you mind explaining a bit more about what that is?

A: Well at first I thought this was just a government project with classified documents. And one of the things that Dr. Humphrey did that I think of--Julius and Ethel Rosenberg being executed for treason, is they had rules and you had to be 18 years old to get a security clearance. But the what caused that moment, where they said, I now realize in retrospect, when they said "Stop working on that commercial project, we need you over here," was a week or so after I had turned 17. And they thought because we had a security officer and he called around, that once you're 17 you can put in an application and get a provisional approval, okay? But it turns out that really wasn't the case. That had to be within three or six months and so on and so forth. So I spent considerable--so after the fact, after I started working, they said "Well, you really can't be there." So I had to have rules, you know? I was around classified stuff, but the classified stuff really wasn't--I mean the documents were classified and you had to handle them special.

What was important is that the knowledge that this was for the purpose of trying to detect missile launches from outer space--and this isn't from 300 miles, this is from above the Van Allen radiation belts. I have a link to a pre-computer, actually, cartoonist animation of how they did this. And there were three brilliant areas of technology, one was the propulsion, one was the electronics and the other was the detector. Obviously, if you didn't have the detector, there was no sense in doing the other stuff.

And so black means that you have to have a story that doesn't tell what you're doing, okay? And no one is to know what happens here. And people think of aliens in Area 51 and all that stuff. It

happens all over the United States, okay? But the reason you don't know about it is we don't have too many Snowden's, okay. Everyone who keeps this stuff knows the importance of what they're doing and don't talk about it. Back in the day that we did it, this was like a level above top secret and my security clearance, people still don't even know today, it was Secret B--they could no longer use "Top Secret" because you know that would raise a red flag. They had to figure out ways of not letting people be aware that there was this project in Cambridge and here's what the address is. It was the Cold War and it was very--it was strange time and there really were spies. And I didn't realize it, and one of the questions I was asked before this interview is, well was this a military thing? And I was a civilian and everyone was in plain clothes.

But when I went the first time to take a vacation, I thought, like you would take a vacation, they'd want to know, well who's going to cover for you and how many days, is it five days and when is it. They wanted to know where I was going and how I was getting there. And they wanted me to check in. And it wasn't much of a problem, I would visit my real original mentor, Dr. Leonard Jaffe, who was a pioneer in the NASA space program. I have some pictures of him explaining to the astronauts how to land on the moon without getting hurt...Is that, they didn't have a problem with California--Boston to LA by plane, no problem. Go to Mexico? No problem, okay. You want to go to the United Kingdom, you're going to go and come back, that would be okay.

My younger brother was in the Greater Boston Symphony Orchestra, they were planning a trip to go to Prague, and Vienna, and all these cities with symphony orchestras. I didn't know, I failed history. The French teacher, after the first half a year, who was expecting great things because my sister, my older sister, was so great, said "Don't come back," okay, because I'm no good with language, and I'm no good with history. But the--I was all excited about that trip, okay, but they asked me questions. They said "What is the list--which cities are you going to," okay. That was the first step. So I said "I'll find out. I don't know, it's wherever the symphony orchestras are." So

I gave them a list of cities and they went with [00:39:24] "Can't go to that one, can't go to that one, and can't go to that one." I said "Why?" And they wouldn't tell me why. And it turns out, now that I can go on the internet, the Soviet Union--it wasn't the Soviet Union, but they were former Iron Curtain countries and they all had networks with...Even though it was Austria or Hungary or--they still had operational intelligence whatever and they just wouldn't let me go there.

So then I said "Okay, I'll skip the cities. I'll just go for the first week." And because that--these were near the end of the list. And they said "We want to know how you're going between point A

and B." And I said "I'll get back to you." So I got back and I said "They're chartering a bus." They're doing like, what was the movie about, if it's Tuesday it must be Belgium? This was going to be one of those. You were going to get on a bus for two weeks, okay, and go. And then they said "We'll have to get back to you," and they looked at a map and they said "Nah, you can't, the bus goes--no, no, through the Alps, you can't go through the Alps, no." And so on and so forth. And so I would have been very upset about that, except the exchange rate almost doubled or cut in half and then the kids couldn't afford it. It was going to be like a \$2000 trip, it ended up being like a \$4000 dollar trip and they just cancelled the whole thing. But that--now, if you were to be in the military now, they would be doing stuff like that, depending on what you're working on.

Q: So the black project really referred to how...

A: The black project was super security that takes place so that nobody knows what you're doing, okay. So what I had to do was, I had not yet--I was a junior in high school, but it was the summer, and back then you could wait until the beginning of your senior year. Now you've got to plan when you're in elementary school, which college you're going to go to, right? Okay, so I had just finished, I think, SAT's. I got really great SAT's, not in language and stuff like that, English was just barely passable, but in the science stuff I was, you know, great. So where would I like to

go? Well MIT, maybe they'd take me, maybe they wouldn't, but...how do I do that and work at the same time? So the thing that came to the top of list was Northeastern, because they had a co-op program. So we had to develop a white story for them, why I was working here. The way co-op works is you and I work as co-ops, I go back to school, you take my job over. They wanted to send someone to replace me to the job. So again, you know, the security guy, the personnel department--the personnel department actually signed the paperwork for Electronics Corporation of America to be a co-op work site, but they never managed to find quite the right fit between the student. And that was just a ongoing, you know, that was just one of like, 20 things. And my parents didn't know.

I have in here, I didn't know until long after my mother's death, she read The Globe every morning. She had cut out one of the articles--one of the other emergency staff meetings was there was a newspaper article about a spy launch in Cape Canaveral. And for the first time no one was allowed near where the launch pad was. It got on the AP press, then it was--they got their white and their black stories confused and let some stuff in the story. If you read the story, that one story explains to you what the Defense Satellite Program was about, okay. And it was in the newspaper. But now they had to let everybody know that, you know, "Anyone asks you about the story in the newspaper," and they actually--there's a collection of clippings from all the different newspapers, okay, that you--"here's what we're going to tell them: that no, they're confused with, you know, the weather satellite and the other, they just got confused," okay. So the fact is is that people in the aerospace industry primarily in the West Coast, they knew exactly what we were doing, but you know black means that, you know, the Russians probably know but the general public does not.

Q: Right. Yeah, so onto our final question of the day. What would you like people to know 100 years from now about what, kind of--your role in this project and how this product affected everything.

A: Well, the Air Force already did a documentary because they--what the DSP program was, was the beginning of what's now called, has been through multiple iterations, is now the US Air Force Space Command. And in April of 2015, 60 Minutes did two 20-minute segments explaining. But at the end when they got to--and they actually showed my satellite, okay, and also the X35, the space plane--and even the General, okay, started talking about stuff, and then he shut up and said "We don't know what we're going to do with that yet." But hanging in the headquarters of 35,000 military and civilian people that do all sorts of stuff in outer space, including the GPS that's in your phone, okay, which was originally a major thing....all started with this very first project, which was to do launch detection.

Now we have--if you look on the internet you'll see all the satellites that are in orbit around the earth. You won't see these; they're there on the blacklist, okay. So that's another way to explain, you know, what the blacklist is. Because there's astronomers and whatever that put all these things on databases, and I was sort of curious, so I looked, and it's not there. Because someone talks to them and says "You can't put that on," okay.

So with the exception of the 2012 airline downing, where the guy got on live TV and said stuff that he shouldn't have, that actually sparked the whole thing of going public. Because to me logically, it should have been public in the first place, that every country in the world should know, if they're going to launch a missile, that we are going to know about it. And it doesn't have to be a missile, it could be--I mean, it's sensitive enough to do, you know, rocket launchers and all that stuff.

So it's very serious business and the reason they went to 60 Minutes was, they were naming the Chinese who had shot stuff into outer space and created space junk, is you destroy a bunch of satellites in outer space and the whole world will get inconvenienced big time. So the reason the Air Force did that documentary was that the 45th anniversary--I didn't know they did, until after I did the oral history like I'm doing today, that November 6th of 1970, so November 6th of

2015 was their 45th anniversary. They celebrate this like it's a human being. I don't know why they don't do it every year, except they probably don't have the budget to do the party, okay. But this is the videotape that the Air Force did to explain the beginnings, because I was 16 and everyone else was 30 years older than me, and the last person on the team who had Parkinson's and whatever just died six weeks ago and he was 94, okay. And there's just nobody left, okay. It's not the only project like this, there's projects like this that get done all the time. But what impressed me really the most was the fact that an absolute top notch academic had done all these Freedom of Information Acts and got all these interesting documents from which I learned some things that I didn't know, okay. But it didn't tell you what had really gone on.

Q: So it looks like our time is just about up. Thank you so much for taking the time to talk with us. It was really extremely interesting. We're really happy to be able to include you in the Newton Talks Oral History Project.

A: Thank you.